## REQUEST FOR RECONSIDERATION

The Examiner rejected Claims 1-4 and 6-9 under 35 U.S.C. §103(a) as being unpatentable over Peterson et al. (U.S. Patent No. 6,674,159) in view of Ouellet et al. (U.S. Patent No. 6,902,656). The Examiner stated that "Peterson disclosed treating the housing to form a tungsten layer on the interface portions . . . and overlaying a layer on the tungsten layer . . . , " but acknowledged that " it failed to disclose overlaying a palladium layer on the tungsten layer. " The Examiner stated however that " Ouellet discloses a process for preparing an electronic package [having] a housing . . . treating the housing to form a tungsten layer on the interface portions; overlaying a palladium layer on the tungsten layer; and applying a protective coating on the palladium layer. " The Examiner concluded that:

> Since Peterson et al. and Ouellet are both from the same field of endeavor, a process for preparing an electronic package, the purpose directed by Ouellet et al. would be recognized in the pertinent art of Peterson et al. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Peterson et al. by overlaying a palladium layer on the tungsten layer as taught by Ouellet to increase yield.

In reply, Applicants respectfully submit that the combination proposed by the Examiner fails to render the claimed invention obvious. Specifically, the combination fails to support a *prima facie* showing of obviousness for the following alternative reasons: (1) the combination fails to disclose each and every element of the invention; and (2) there is no motivation to combine the individual references.

**Claimed Invention:**

The claimed invention provides a process for preparing a ceramic package which is both hermetically sealed and non-magnetic. Specifically, the claimed invention is directed to a process for preparing a ceramic surface for soldering with a non-magnetic material by first treating the surface with tungsten and then overlaying the tungsten layer with palladium.

Implicit in the claimed invention is Applicants' discovery of a problem associated with prior art approaches to non-magnetic ceramic packaging. The

problem stems from two sources: (1) the type of metallurgy used in the construction of the ceramic packages, and (2) the process by which the metallurgy is applied. Current technologies employ nickel and copper deposited electrochemically in multiple thin layers which are then sintered to form a quasi non-metallic alloy. This is a complex alloy which is subject to process variations. For instance, to form a non-magnetic nickel-copper alloy, the correct stoichiometry between Ni and Cu must be maintained which is difficult. Difficulties in the electrochemical deposition process and irregularities in the surface characteristics of the ceramic housing cause the thickness of the layers to vary. Varying thickness between the layers of nickel and copper necessarily disturbs this critical stoichiometric relationship resulting in excessive nickel in some locations and a deficiency in others at the time of sintering. This disturbance in the strochiometric balance results in an alloy having inconsistent non-magnetic properties. (Appln. ¶009.)

The claimed invention avoids the prior art problems by using only a single metallurgy of palladium. Palladium is not only non-magnetic, but also has bonding characteristics with tungsten similar to those of nickel. Therefore, like nickel, palladium is used as a " primer " for the solder seal between the housing and the lid. Furthermore, palladium can be deposited on the housing in a controlled fashion, requiring, in a preferred embodiment, only a single layer to be applied. This is a straight-forward procedure and does not depend on controlling the thickness of multiple layers. Therefore, the process of the claimed invention provides greater control over the non-magnetic properties of the ceramic package and the ability to manufacture the packages repeatedly and reliably. (Appln. ¶010.)

**Peterson:**

Peterson discloses a micro-electric device package which has an integral window for housing a micro-electronic device. The integral window is bounded directly to the package without having a separate layer of adhesive material disposed in between the window and the package. Purportedly, the package disclosed therein results in a compact, low profile package having an integral window that is

hermetically sealed to the package prior to mounting and interconnecting the micro-electric devices. (Abstract). Although Peterson does disclose the known technique for preparing a ceramic surface for adhesion/bonding by treating it with tungsten, it does not disclose treating the tungsten with palladium in preparation for solder. Indeed, the use of palladium is discussed in Peterson only with respect to the preparation of conductive traces – i.e., circuitry – on the ceramic substrate.

**Ouellet:**

Ouellet discloses a packaging technique for microstructures within a vacuum-sealed cavity. Specifically, Ouellet discloses depositing an aluminum or aluminum alloy capping layer over a cavity defined in a silicon wafer. The capping layer is strengthened by depositing over it a protective layer having suitably-high tensile strength. Purportedly, this approach eliminates the need to solder a cover or lid on the silicon wafer substrate. Therefore, Ouellet discloses a different approach for packaging microstructures in which a layer is deposited on top of a substrate containing the microstructures rather than a cap being soldered to the substrate.

**1. A Prima Facie Showing Of Obviousness Has Not Been Established Since The Combination Of Peterson And Ouellet Fails To Disclose The Claimed Invention As A Whole**

**Neither reference discloses treating the ceramic surface with palladium in preparation for soldering**

It is well established in US patent law that to support a *prima facie* showing of obviousness, each and every element of the claimed invention must be disclosed by the combination of prior art references. Here, the combination fails to disclose treating the ceramic surface of the housing with palladium to prepare it for soldering with a non-magnetic material. This is a critical step in the process of the claimed invention. As stated in the specification:

> Although tungsten provides a sound base upon which other metals may be deposited, it is, itself, not solderable. Therefore, to form a hermetic seal along the interface portions of the ceramic housing, the tungsten layer must be coated with a material which is solderable but which is not magnetic. The Applicants have found that palladium serves this purpose well.

P 31. Therefore, this element of the claimed invention must be found in the combination of the cited prior art to support a *prima facie* showing of obviousness. Neither Peterson nor Ouellet, however, disclose this step.

Although Peterson discloses the well-known prior art technique of treating the ceramic with tungsten in preparation for soldering, it is devoid of any teaching of further treating the ceramic surface with palladium. Likewise, Ouellet fails to disclose treating the ceramic surface with palladium to facilitate soldering. *To the contrary*, Ouellet criticizes, in general, the technique of soldering a top layer or cover to a substrate. As mentioned above, Ouellet is directed at a method of depositing a layer of aluminum or aluminum alloy over the microstructure on the substrate, rather than bonding a second substrate to the main substrate.

Therefore, since neither reference discloses the step of overlaying palladium on a tungsten impregnated ceramic surface to prepare the surface for a non-magnetic, solderable material, a *prima facie* showing of obviousness has not been met. Accordingly, the Examiner is respectfully requested to withdraw his rejection and allow the claims.

**Neither reference recognizes the problem solved by the claimed invention**

It is not surprising that neither reference discloses treating the ceramic surface with palladium since neither reference recognizes the problem associated with non-magnetic soldering in ceramics. The courts have recognized that an invention must be considered *as a whole*, including, for example, the recognition that a patentable invention may lie in the discovery of the source of a problem. Here, inherent in Applicants' process is their discovery of the underlying problems of preparing a ceramic surface for soldering with a non-magnetic material. Specifically, as set forth in the specification, the Applicants recognize that:

> Although nickel is an excellent interface between tungsten and other metals for a solder seal, it tends to be magnetic which can be problematic . . . . Recently this need has been addressed by attempting to render Ni non-magnetic by alloying it with other materials such as copper . . . . Although theoretically the alloy formed should be non-magnetic, Applicants have discovered that this is not the case, and that micro-device packages using this approach still have detrimental magnetic properties.

(Appln. ¶006.) Applicants not only acknowledge the shortcomings of the prior art approach, but also propose possible causes of the problem (as mentioned above) and recommend a solution.

Neither Peterson nor Ouellet acknowledge the problem with non-magnetic solder preparation, much less propose possible causes or solutions. *To the contrary*, Peterson indicates that covers or lids may be attached to the substrates using known nickel bonding techniques:

> Plating fired thick film layers as necessary to establish needed properties such as bondability, solderability and adhesion--i.e., plating with *nickel* in the case of tungsten thick film in HTCC, followed by plating with gold for solderability, bondability, etc. When leads are brazed with CuSil in HTCC, there are two Ni plating steps--one in order to wet to the braze used in lead attachment, and a subsequent Ni plating to cover the braze and serve as a reliable underlayer for the gold.

Peterson therefore fails to recognize the problems of using not only Ni alloys, but even plain Ni in ceramic surface preparation for soldering. Since neither reference suggests in any way the problem to which the claimed invention is directed at solving, they fail to render the invention-- *as a whole* -- obvious. Accordingly, the Examiner should withdraw the rejection and allow the claims.

**2. Not only does the combination fail to teach the elements of the claimed invention, but also there is not motivation to modify the references according to the claimed invention**

**Both references teach away from the process of the claimed invention**

It is well established in U.S. patent law that to establish a *prima facie* case of obviousness, there must be some motivation to modify the references in accordance with the claimed invention. Here, neither reference suggests the benefits of using a palladium layer to prepare a ceramic surface for a solderable material. To the contrary, when the prior art is considered *as a whole*, the references actually *teach away* from the claimed invention. It is well established in U.S. patent law that a prior art reference must be considered in its entirety-- i.e., as a whole -- including portions that would lead away from the claimed invention.

Here, rather than providing motivation for preparing a ceramic surface for solderable materials by treating it with palladium, Peterson clearly teaches away from

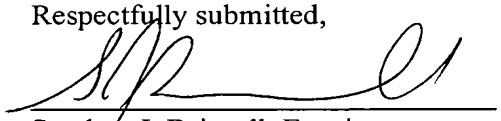
this approach by recommending instead the prior art technique of preparing the surface with nickel as mentioned above. Furthermore, Ouellet clearly indicates that capping one substrate with another is an undesirable method for packaging microstructures and, advocates instead, depositing aluminum or aluminum alloy to encapsulate the microstructure. As set forth in its background section, Ouellet states as follows:

> Unfortunately, the increased demand for higher yield and lower cost processes for the production of CMOS integrated MEMS devices in cost-sensitive markets, such as automotive and consumer electronics, requires the *replacement of* anodic bonding or other *multiple substrates bonding techniques* by a lower cost, single substrate, CMOS compatible wafer-level encapsulation technique.

Col. 8, ll. 18-24 (emphasis added). Therefore, since Peterson discloses using nickel to prepare the surface for a solderable material (i.e., the prior art approach) and since Ouellet advocates avoiding soldering altogether, both references *teach away* from using palladium as a surface treatment for soldering as set forth in the claimed invention. Taking the prior art *as a whole*, their teachings away from the claimed invention are the antithesis of motivation. Accordingly, a *prima facie* case of obviousness cannot be established. Applicants therefore respectfully request the Examiner reconsider his position and withdraw the rejection and allow the claims.

In light of the above remarks, an early and favorable response is earnestly requested.

Respectfully submitted,



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